



10/088,489

**WEST**[Help](#)[Logout](#)[Interrupt](#)[Main Menu](#) [Search Form](#) [Posting Counts](#) [Show S Numbers](#) [Edit S Numbers](#) [Preferences](#) [Cases](#)**Search Results -**

Terms	Documents
L2 and (thermal near5 device)	10

Database:

Search:

**Search History****DATE: Wednesday, October 01, 2003** [Printable Copy](#) [Create Case](#)Set Name Query  
side by sideHit Count Set Name  
result set*DB=USPT; PLUR=YES; OP=ADJ*

<u>L3</u>	L2 and (thermal near5 device)	10	<u>L3</u>
<u>L2</u>	L1 and constituent	45	<u>L2</u>
<u>L1</u>	(electroless) near7 dipping	261	<u>L1</u>

END OF SEARCH HISTORY

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## Search Results - Record(s) 1 through 10 of 10 returned.

 1. Document ID: US 6372608 B1

L3: Entry 1 of 10

File: USPT

Apr 16, 2002

US-PAT-NO: 6372608

DOCUMENT-IDENTIFIER: US 6372608 B1

TITLE: Separating method, method for transferring thin film device, thin film device, thin film integrated circuit device, and liquid crystal display device manufactured by using the transferring method

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>	<a href="#">Claims</a>	<a href="#">KMC</a>
<a href="#">Draw Desc</a>	<a href="#">Image</a>										

 2. Document ID: US 6313411 B1

L3: Entry 2 of 10

File: USPT

Nov 6, 2001

US-PAT-NO: 6313411

DOCUMENT-IDENTIFIER: US 6313411 B1

TITLE: Wafer level contact sheet and method of assembly

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>	<a href="#">Claims</a>	<a href="#">KMC</a>
<a href="#">Draw Desc</a>	<a href="#">Image</a>										

 3. Document ID: US 6046060 A

L3: Entry 3 of 10

File: USPT

Apr 4, 2000

US-PAT-NO: 6046060

DOCUMENT-IDENTIFIER: US 6046060 A

TITLE: Method of making a high planarity, low CTE base for semiconductor reliability screening

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>	<a href="#">KMC</a>	
<a href="#">Draw Desc</a>	<a href="#">Image</a>										

4. Document ID: US 5966593 A

L3: Entry 4 of 10

File: USPT

Oct 12, 1999

US-PAT-NO: 5966593

DOCUMENT-IDENTIFIER: US 5966593 A

TITLE: Method of forming a wafer level contact sheet having a permanent z-axis material

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
<a href="#">Draw Desc</a>   <a href="#">Image</a>										

 5. Document ID: US 5966022 A

L3: Entry 5 of 10

File: USPT

Oct 12, 1999

US-PAT-NO: 5966022

DOCUMENT-IDENTIFIER: US 5966022 A

TITLE: Wafer level burn-in system

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
<a href="#">Draw Desc</a>   <a href="#">Image</a>										

 6. Document ID: US 5909123 A

L3: Entry 6 of 10

File: USPT

Jun 1, 1999

US-PAT-NO: 5909123

DOCUMENT-IDENTIFIER: US 5909123 A

TITLE: Method for performing reliability screening and burn-in of semi-conductor wafers

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
<a href="#">Draw Desc</a>   <a href="#">Image</a>										

 7. Document ID: US 5896038 A

L3: Entry 7 of 10

File: USPT

Apr 20, 1999

US-PAT-NO: 5896038

DOCUMENT-IDENTIFIER: US 5896038 A

TITLE: Method of wafer level burn-in

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>
<a href="#">Draw Desc</a>   <a href="#">Image</a>					<a href="#">KMC</a>				

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8. Document ID: US 5886535 A

L3: Entry 8 of 10

File: USPT

Mar 23, 1999

US-PAT-NO: 5886535

DOCUMENT-IDENTIFIER: US 5886535 A

TITLE: Wafer level burn-in base unit substrate and assembly

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>
<a href="#">Draw Desc</a>   <a href="#">Image</a>					<a href="#">KMC</a>				

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9. Document ID: US 5830565 A

L3: Entry 9 of 10

File: USPT

Nov 3, 1998

US-PAT-NO: 5830565

DOCUMENT-IDENTIFIER: US 5830565 A

TITLE: High planarity and low thermal coefficient of expansion base for semi-conductor reliability screening

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>
<a href="#">Draw Desc</a>   <a href="#">Image</a>					<a href="#">KMC</a>				

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10. Document ID: US 5766979 A

L3: Entry 10 of 10

File: USPT

Jun 16, 1998

US-PAT-NO: 5766979

DOCUMENT-IDENTIFIER: US 5766979 A

TITLE: Wafer level contact sheet and method of assembly

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>
<a href="#">Draw Desc</a>   <a href="#">Image</a>					<a href="#">KMC</a>				

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Terms	Documents
L2 and (thermal near5 device)	10

**Display Format:**

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L2 and (insulat? near2 layers)

0

US Patents Full Text Database  
US Pre-Grant Publication Full-Text Database  
JPO Abstracts Database  
EPO Abstracts Database  
Derwent World Patents Index  
IBM Technical Disclosure Bulletins

**Database:**

L7

**Search:**[Refine Search](#)[Recall Text](#)[Clear](#)**Search History****DATE: Wednesday, October 01, 2003** [Printable Copy](#) [Create Case](#)**Set Name** **Query**  
side by side**Hit Count** **Set Name**  
result set*DB=USPT; PLUR=YES; OP=ADJ*

<u>L7</u>	L2 and (insulat? near2 layers)	0	<u>L7</u>
<u>L6</u>	L2 and (thermo? near4 semiconductor)	0	<u>L6</u>
<u>L5</u>	L2 and thermoelectric	0	<u>L5</u>
<u>L4</u>	L2 and (semiconductor adj device)	4	<u>L4</u>
<u>L3</u>	L2 and (thermal near5 device)	10	<u>L3</u>
<u>L2</u>	L1 and constituent	45	<u>L2</u>
<u>L1</u>	(electroless) near7 dipping	261	<u>L1</u>

END OF SEARCH HISTORY

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## End of Result Set

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L4: Entry 4 of 4

File: USPT

Oct 3, 2000

DOCUMENT-IDENTIFIER: US 6127199 A

TITLE: Manufacturing method of active matrix substrate, active matrix substrate and liquid crystal display device

Detailed Description Text (30):

The method of forming the separation layer 2 is not limited, and is appropriately selected according to conditions such as the film composition, the thickness, and the like. Examples of the forming method include various vapor phase deposition methods such as CVD (including MOCVD, low-pressure CVD and ECR-CVD), evaporation, molecular beam evaporation (MB), sputtering, ion plating, PVD, and the like; various plating methods such as electroplating, immersion plating (dipping), electroless plating, and the like; coating methods such as Langmuir-Blodgett's (LB) technique, spin coating, spray coating, roll coating, and the like; various printing methods; a transfer method; an ink jet method; a powder jet method; and the like. The separation layer may be formed by a combination of at least two of these methods.

Detailed Description Text (39):

The transferred layer 140 (thin film device layer) is a layer containing thin film devices such as TFTs or the like, as shown on the right hand side of FIG. 2. Besides TFTs, examples of thin film devices include thin film diodes and other thin film semiconductor devices, electrodes (for example, transparent electrodes such as ITO and mesa films), switching devices, memory, actuators such as piezoelectric devices, micro mirrors (piezo thin film ceramics), magnetic recording thin film heads, coils, inductors, thin film materials with high permeability and micro magnetic devices comprising a combination of these materials, filters, reflecting films, dichroic mirrors, and the like.

Detailed Description Text (53):

The transfer material 180 may comprise an independent device, such as a liquid crystal cell, or a portion of a device, such as a color filter, an electrode layer, a dielectric layer, an insulation layer or a semiconductor device.

Detailed Description Text (58):

The principle of occurrence of internal exfoliation and/or interfacial exfoliation in the separation layer 120 is thought to be based on ablation occurring in the constituent material of the separation layer 120, discharge of gases contained in the separation layer 120 and a phase change such as melting or

vaporization caused immediately after irradiation.

Detailed Description Text (59) :

The ablation means that a solid material (the constituent material of the separation layer 120) which absorbs light is photochemically or thermally excited to discharge atoms or molecules due to cutting of bonds in the surface and inside of the material. This mainly occurs as the phenomenon that a phase change such as melting, vaporization (evaporation) or the like occurs in the whole or part of the constituent material of the separation layer 120. Also, in some cases, the phase change causes a fine foam state, and decreases the adhering strength.

## WEST

 Generate Collection 

L4: Entry 3 of 4

File: USPT

Feb 6, 2001

DOCUMENT-IDENTIFIER: US 6183886 B1

TITLE: Tin coatings incorporating selected elemental additions to reduce discoloration

Brief Summary Text (5):

Copper and copper alloy substrates are formed into articles for use as electrical and electronic components, such as electrical connectors and leadframes. Copper and copper alloys readily oxidize when exposed to oxygen containing atmospheres and readily tarnish when exposed to sulfur containing atmospheres. Both oxidation and tarnish are exacerbated at elevated temperatures, defined herein as temperatures above about 125.degree. C. Since air contains oxygen as a major constituent and sulfur as a common pollutant, under the hood automotive connectors and appliance connectors are exposed to oxidizing and tarnishing environments.

Brief Summary Text (9):

Japanese Kokai No. 3 (1991)-239,353 published Oct. 24, 1991, discloses a copper leadframe for semiconductor devices having a zinc layer disposed between the copper substrate and a tin-base tin/lead solder coat. The zinc layer is disclosed to be a barrier layer that reduces interdiffusion between the tin and the copper leading to enhanced solder wettability when heated.

Brief Summary Text (11):

An article, such as a copper or copper-base alloy electrical connector or electronic component, may be coated with a tin or tin-base coating (The term "base" is intended to convey that the alloy contains at least 50%, by weight, of the specified element. Tin or tin base coatings will be referred to herein as tin coatings. All percentages are in weight percent unless otherwise specified.) by any one of a number of conventional processes such as electroplating, hot dipping, electroless chemical deposition, vapor deposition or cladding.

## WEST

 Generate Collection 

L4: Entry 2 of 4

File: USPT

Apr 16, 2002

DOCUMENT-IDENTIFIER: US 6372608 B1

TITLE: Separating method, method for transferring thin film device, thin film device, thin film integrated circuit device, and liquid crystal display device manufactured by using the transferring method

Brief Summary Text (25):

In the above-mentioned exfoliating methods, the exfoliation of the separation layer is caused by an elimination of or a decrease in the adhering force between atoms or molecules in the constituent substances in the separation layer.

Detailed Description Text (11):

The separation layer 2 will now be described. The separation layer 2 absorbs the incident light 7 to cause exfoliation in the layer and/or at an interface 2a or 2b (hereinafter referred to as "internal exfoliation" and "interfacial exfoliation"). Irradiation by the incident light 7 causes an elimination or reduction of the adhering force between atoms or molecules in the constituent substance of the separation layer 2, that is, ablation, and internal and/or interfacial exfoliation will occur as a result. Further, in some cases, gas will be released from the separation layer 2 by the incident light 7, resulting in the exfoliation. Consequently, there are two exfoliation mechanisms, that is, releasing components contained in the separation layer 2 as gas, and instantaneous vaporization of the separation layer 2 by absorption of the light followed by release of the vapor.

Detailed Description Text (24):

The method for forming the separation layer 2 is not limited, and is determined depending on several conditions, such as the film composition and thickness. Examples of the methods include vapor phase deposition processes, such as CVD (including MOCVD, low pressure CVD, ECR-CVD), evaporation, molecular beam (MB) evaporation, sputtering, ion-plating, and PVD; plating processes, such as electro-plating, dip-plating (dipping), and electroless-plating; coating process, such as a Langmuir-Blodgett process, spin-coating process, spray-coating process, and roll-coating process; printing processes; transfer processes; ink-jet processes; and powder-jet processes. A combination of these processes may also be used. For example, when the separation layer 2 is composed of amorphous silicon (a-Si), it is preferable that the layer be formed by a low pressure CVD process or a plasma CVD process. Alternatively, when the separation layer 2 is composed of a ceramic by a sol-gel process, or an organic polymer, it is

preferable that the layer be formed by a coating process, and particularly a spin-coating process. The separation layer 2 may be formed by two or more steps (for example, a layer-forming step and an annealing step).

Detailed Description Text (30):

The purpose for forming the transferred layer 4, and type, shape, structure, composition, and physical and chemical characteristics of the transferred layer 4 are not limited, and it is preferable that the transferred layer 4 be a thin film, and particularly a functional thin film or thin film device. Examples of functional thin films and thin film devices include thin film transistors; thin film diodes; other thin film semiconductor devices; electrodes (e.g. transparent electrodes such as ITO and mesa films); photovoltaic devices used in solar batteries and image sensors; switching devices; memories; actuators such as piezoelectric devices; micromirrors (piezoelectric thin film ceramics); recording media such as magnetic recording media, magneto-optical recording media, and optical recording media; magnetic recording thin film heads, coils, inductors and thin film high permeability materials, and micro-magnetic devices composed of combinations thereof; optical thin films such as filters, reflection films, dichroic mirrors, and polarizers; semiconductor thin films; superconducting thin films, e.g. YBCO thin films; magnetic thin films; and multi-layered thin films, such as metallic multi-layered thin films, metallic-ceramic multi-layered thin films, metallic multi-layered semiconductor thin films, ceramic multi-layered semiconductor thin films, and multi-layered thin films including organic layers and other layers. Among them, application to thin film devices, micro-magnetic devices, three-dimensional micro-articles, actuators, and micromirrors is useful.

Detailed Description Text (45):

The transfer member 6 may function as an independent device, such as a liquid crystal cell, or as a part of a device, for example, a color filter, an electrode layer, a dielectric layer, an insulating layer, and a semiconductor device. Further, the transfer member 6 may be composed of metal, ceramic, stone, wood, or paper. Alternatively, it may be a surface of a given article (the surface of a watch, clock, air conditioner, or print board), or a surface of a given structure, such as a wall, pillar, post, beam, ceiling, or window glass.

Detailed Description Text (47):

FIG. 6 shows a state of the internal exfoliation in the separation layer 2, and FIG. 7 shows a state of the interfacial exfoliation at the interface 2a on the separation layer 2. The occurrence of the internal and/or interfacial exfoliation presumes that ablation of the constituents in the separation layer 2 occurs, that gas retained in the separation layer 2 is released, and that phase transition such as melting or vaporization occurs immediately after the light irradiation.

Detailed Description Text (48):

The word "ablation" means that solid components (the constituents of the separation layer 2), which absorbed the incident light, are photochemically and thermally excited and atoms or molecules in the

**WEST**[Generate Collection](#)[Print](#)**Search Results - Record(s) 1 through 4 of 4 returned.** **1. Document ID: US 6607981 B1**

L4: Entry 1 of 4

File: USPT

Aug 19, 2003

US-PAT-NO: 6607981

DOCUMENT-IDENTIFIER: US 6607981 B1

TITLE: Method for forming a Cu interconnect pattern

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>	<a href="#">KMC</a>	
<a href="#">Draw</a>	<a href="#">Desc</a>	<a href="#">Image</a>									

 **2. Document ID: US 6372608 B1**

L4: Entry 2 of 4

File: USPT

Apr 16, 2002

US-PAT-NO: 6372608

DOCUMENT-IDENTIFIER: US 6372608 B1

TITLE: Separating method, method for transferring thin film device, thin film device, thin film integrated circuit device, and liquid crystal display device manufactured by using the transferring method

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>	<a href="#">KMC</a>	
<a href="#">Draw</a>	<a href="#">Desc</a>	<a href="#">Image</a>									

 **3. Document ID: US 6183886 B1**

L4: Entry 3 of 4

File: USPT

Feb 6, 2001

US-PAT-NO: 6183886

DOCUMENT-IDENTIFIER: US 6183886 B1

TITLE: Tin coatings incorporating selected elemental additions to reduce discoloration

<a href="#">Full</a>	<a href="#">Title</a>	<a href="#">Citation</a>	<a href="#">Front</a>	<a href="#">Review</a>	<a href="#">Classification</a>	<a href="#">Date</a>	<a href="#">Reference</a>	<a href="#">Sequences</a>	<a href="#">Attachments</a>	<a href="#">KMC</a>	
<a href="#">Draw</a>	<a href="#">Desc</a>	<a href="#">Image</a>									

4. Document ID: US 6127199 A

L4: Entry 4 of 4

File: USPT

Oct 3, 2000

US-PAT-NO: 6127199

DOCUMENT-IDENTIFIER: US 6127199 A

TITLE: Manufacturing method of active matrix substrate, active matrix substrate and liquid crystal display device

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
<a href="#">Draw Desc</a>   <a href="#">Image</a>										

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Terms	Documents
L2 and (semiconductor adj device)	4

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Terms	Documents
L2 and constituent	0

Database:

Search:

**Search History**DATE: Wednesday, October 01, 2003 [Printable Copy](#) [Create Case](#)Set Name Query  
side by sideHit Count Set Name  
result set

DB=USPT; PLUR=YES; OP=ADJ

<u>L7</u>	L2 and constituent	0	<u>L7</u>
<u>L6</u>	L3 and constituent	0	<u>L6</u>
<u>L5</u>	L4 and constituent	0	<u>L5</u>
<u>L4</u>	L3 and (metallic adj film)	10	<u>L4</u>
<u>L3</u>	L2 and (contact near5 surface)	214	<u>L3</u>
<u>L2</u>	L1 and (plating adj bath)	662	<u>L2</u>
<u>L1</u>	method near2 (electroless)	1911	<u>L1</u>

END OF SEARCH HISTORY

US-PAT-NO: 4400436

DOCUMENT-IDENTIFIER: US 4400436 A

TITLE: Direct electroless deposition of cuprous oxide films

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
<a href="#">Draw Desc</a>   <a href="#">Image</a>										

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5. Document ID: US 4349583 A

L4: Entry 5 of 10

File: USPT

Sep 14, 1982

US-PAT-NO: 4349583

DOCUMENT-IDENTIFIER: US 4349583 A

TITLE: Laser enhanced maskless method for plating and simultaneous plating and etching of patterns

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
<a href="#">Draw Desc</a>   <a href="#">Image</a>										

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6. Document ID: US 4315055 A

L4: Entry 6 of 10

File: USPT

Feb 9, 1982

US-PAT-NO: 4315055

DOCUMENT-IDENTIFIER: US 4315055 A

TITLE: Direct electroless deposition of cuprous oxide films

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
<a href="#">Draw Desc</a>   <a href="#">Image</a>										

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7. Document ID: US 4091172 A

L4: Entry 7 of 10

File: USPT

May 23, 1978

US-PAT-NO: 4091172

DOCUMENT-IDENTIFIER: US 4091172 A

TITLE: Uniform gold films

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
<a href="#">Draw Desc</a>   <a href="#">Image</a>										

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8. Document ID: US 4091128 A

L4: Entry 8 of 10

File: USPT

May 23, 1978

US-PAT-NO: 4091128

DOCUMENT-IDENTIFIER: US 4091128 A

TITLE: Electroless gold plating bath

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
Draw Desc	Image									

 9. Document ID: US 3841892 A

L4: Entry 9 of 10

File: USPT

Oct 15, 1974

US-PAT-NO: 3841892

DOCUMENT-IDENTIFIER: US 3841892 A

TITLE: METHOD FOR TRANSFERRING DEVELOPED IMAGE

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
Draw Desc	Image									

 10. Document ID: US 3691993 A

L4: Entry 10 of 10

File: USPT

Sep 19, 1972

US-PAT-NO: 3691993

DOCUMENT-IDENTIFIER: US 3691993 A

TITLE: APPARATUS FOR TRANSFERRING DEVELOPED IMAGE

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
Draw Desc	Image									

Terms	Documents
L3 and (metallic adj film)	10

Display Format:Previous PageNext Page

## WEST

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L4: Entry 2 of 10

File: USPT

Mar 15, 1994

DOCUMENT-IDENTIFIER: US 5294319 A

TITLE: High surface area electrode structures for electrochemical processes

Brief Summary Text (7):

In the case of valve metal woven wire constructions, for example titanium, the conductive paths through just the long wire lengths are not adequate for an even distribution of the current throughout the structure. The woven material to be used as an effective 3-dimensional high surface area electrode structure also requires a fiber to fiber electrical contact, which depends on the fiber surfaces and their corresponding areas being conductive and intimately in contact with each other. Since valve metals form protective nonconductive oxide films on their surfaces, these conductive contact points may not be stable in the electrochemical system and form nonconductive oxides, and the material will then not be suitable as an electrode. Also, woven materials, both made from either stainless steel or valve metals, have been observed to not be suitable as electrode structures in electrochemical cells for operation at current densities greater than about 1 to 2 KA/m<sup>2</sup>. One explanation is that the 3-dimensional electrical conductivity of the structure relying on a mechanical fiber to fiber contact is not adequate above this range, resulting in a substantially higher cell electrode operating voltage with corresponding changes in the competitive electrochemical reactions occurring at the electrode surfaces. Another explanation for inadequate performance of woven structures made from multi-filament strands (or tow bundles) is that the porosity of these structures is non-uniform, such that the zones with highest surface area do not allow penetration of current through the electrolyte between closely spaced fibers.

Brief Summary Text (21):

The current distributor or backing plate may be in a screen, expanded metal, perforated plate or solid plate form. The backing plate or current distributor may be made of a graphite material which can be surface treated with the same or similar materials used as the electrocatalyst on the porous high surface area electrode structure mentioned above. Other alternative materials suitable for use as a current distributor include oxidation chemical resistant valve metal structures such as titanium, tantalum, niobium or zirconium with or without a conductive or electrocatalytic metallic film or oxide coating. The selected electrocatalytic coating types are metallic platinum, gold or palladium or other precious metals or oxide-type coatings. Other coatings such as ferrite-based magnesium or manganese-based oxides

may also be suitable.

Brief Summary Text (35) :

This second process step serves to remove any natural occurring protective oxide films, particularly in the case where valve metals are used as the substrates. Generally, chemical etchant acids such as HCl, H<sub>2</sub>SO<sub>4</sub>, oxalic acid or HF may be used to remove or dissolve the oxide film. Specifically, in the case of titanium, a titanium oxide (TiO<sub>2</sub>) film is present on the titanium surface. An acid chemical etch is suitable, such as hot concentrated HCl or oxalic acid, to both remove or dissolve the oxide film and to produce a roughened surface on the titanium fiber substrate onto which to plate, for example, platinum metal or to bond a thermal oxide to the surface. The choice of acids depends on the substrate surface texture and surface area required for the electrochemical process application. After the surface oxide is sufficiently etched, the acid is rinsed from the electrode surface using deionized water. Then the etched substrate is immediately placed into the plating bath if an electroless plating operation is used. The acid bath and rinse can be carried out in an inert atmosphere, such as nitrogen or argon, to reduce the amount of any new oxide formation on the surfaces of the etched electrode structure. The deionized water can also be purged with nitrogen before use. For the thermal oxide electrocatalyst surface preparations, acid etching with deionized water rinsing is generally used before the application of the electrocatalyst solutions to the electrode surfaces.

Brief Summary Text (39) :

Metallic coatings are preferably applied by electroless methods since the precious metal deposition is generally much better distributed than that by electrolytic and thermal deposition methods. In electroless plating, the chosen metallic precious metals can be easily directly deposited onto the individual high surface area fiber elements comprising the entire electrode structure electrode under specified temperatures, solution concentrations, pH, and agitation conditions, such as those set forth in U.S. patent application Ser. No. 07/739,041, filed Aug. 1, 1991.

Brief Summary Text (44) :

These thermal heat treatments, preferably under a high vacuum, are especially useful for preparing metallic, intermetallic or metal alloy electrocatalysts of the metals deposited on and in intimate contact on the surfaces of the high surface area electrode substrate material. Many different intermetallic compounds or alloy electrocatalysts may be formed, such as platinum in combination with other metals such as those in the platinum group metals or with gold, silver or with the group of transition metals in the periodic table. The heat treatment can also form intermetallics or alloys with the electrode base substrate, for example, platinum-titanium alloys. In this case, the surface area of the electrocatalyst on the surface of the substrate will change, but the alloy formed material may have unique electrocatalyst, corrosion and operating life properties that cannot be predetermined.

Detailed Description Text (5):

The rinsed fibers were then put into another glass tank with an external hot plate and immersed into the 10 liter electroless platinum plating solution, initially having an ambient temperature of about 25.degree. C. and then heated. Nitrogen gas bubbles were immediately evolved from the surface of the fibers upon addition to the electroless bath. This indicated the plating of platinum onto the surfaces of the fibers. The bubble evolution decreased to small amounts after about 30 minutes as the solution temperature slowly increased. The loss of the orange-yellow color to a water color in the plating solution is an indication of the extent of the completion of the platinum plating. Verification of the presence of residual platinum in the plating bath was done by taking samples of the plating solution and making the sample alkaline by the addition of 10% NaOH. A black precipitate indicated some residual platinum was left in the plating bath.

Detailed Description Text (6):

The plating solution with the fibers was heated to a temperature of about 100.degree. C. There were still significant amounts of platinum in the plating solution at the end of 4 hours. The plating bath was kept at that temperature overnight for a total time of about 16 hours. At the end of 16 hours there was no soluble platinum left in the plating solution. The plating was therefore completed sometime in the time period of between 4 to 16 hours. The plated titanium fibers had a dull metallic luster. If a thin, continuous layer of platinum were deposited on the titanium fibers, the calculated coating thickness of the platinum was estimated to be about 0.13 microns.

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TITLE: Process for producing an electrode by electroless deposition

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 2. Document ID: US 5294319 A

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 3. Document ID: US 5234562 A

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File: USPT

Aug 10, 1993

US-PAT-NO: 5234562

DOCUMENT-IDENTIFIER: US 5234562 A

TITLE: Electroplating apparatus for coating a dielectric resonator

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 4. Document ID: US 4400436 A

L4: Entry 4 of 10

File: USPT

Aug 23, 1983